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AMSAT NEWS SERVICE
ANS-031

The AMSAT News Service bulletins are a free, weekly news and information service of AMSAT North America, The Radio Amateur Satellite Corporation. ANS publishes news related to Amateur Radio in space including reports on the activities of a worldwide group of Amateur Radio operators who share an active interest in designing, building, launching and communicating through analog and digital Amateur Radio satellites.

The news feed on http://amsat.org publishes news of Amateur Radio in space as soon as our volunteers can post it.

Please send any amateur satellite news or reports to ans-editor at amsat dot org.

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ANS-031 AMSAT News Service Weekly Bulletins

AMSAT News Service Bulletin 031.01
>From Radio Amateur Satellite Corporation (AMSAT) 712 H Street NE Suite 1653, Washington, DC 20002
January 31, 2021
To ALL RADIO AMATEURS
BID: $ANS-031.01

RadFxSat-2 Update (January 29, 2021)

>From AMSAT Vice President - Engineering Jerry Buxton, N0JY:

"Thanks go to W5SAT, who applied the amateur radio spirit of exploration and innovation to helping find out "what's up?" with RadFxSat-2.

"We appreciate his work and immediately applied it to our processes as we discover/recover RadFxSat-2.

"Why was it not heard or found week ago? There could be an unexplained behavior such that it could not and was not able to occur until the other day. Our stations attempted transponder use under various conjectured and commanded states throughout this period as part of the exploration of the anomaly, but did not detect any signals. They were able to confirm their signals the night of the 27th.

"Following that we turned attention to the beacon, as you know. We have not discovered the beacon yet and we have contacted some top class "big gun" stations, asking for their help. The signal will obviously be pipsqueak and may not even be there. The drive to find it, or if it is not detected then

to take possible actions to activate it, is the information in the telemetry that is paramount to knowing through satellite data exactly what is going on. We asked you that the transponder not be used because any power to signals in the transponder downlink is power stolen from the beacon strength. We have asked everybody to listen, as from the beginning, to help find it and find status and solutions faster. It may sound boring or useless but it is at the heart of every satellite launch and commissioning phase and perhaps the biggest part the general satellite community can play in the lifetime of the satellite. The payoff is important to all of us, and I invite anyone to join the hunt and share in the enjoyment of - whatever happens.

"I can't say what we will be doing tomorrow for sure, we will be looking for any reports and telemetry as more and larger stations join and because we have seen behavior that is not clearly understood. Procedures and conclusions that are not carefully thought out could result in losing what we have now. It is comparable to NASA taking careful time in dealing with anomalies (barring safety-related issues). Very importantly, we will be watching to see if anyone captured anything at all from the telemetry in the beacon. All you have to do is hunt and catch one frame and you are a hero in this game. Your help is greatly appreciated.

"Unless there is some big news over the weekend, I expect that Monday evening would be the next opportunity for a short update, time permitting."

[ANS thanks Jerry Buxton, N0JY, AMSAT Vice President - Engineering for the above information]

RadFxSat-2 Signals Detected, AMSAT Engineering Continues to Assess Status (January 28, 2021)

On January 27, 2021, Brad Schumacher, W5SAT, reported copying his CW signal weakly via the RadFxSat-2 transponder. On the morning of January 28, AMSAT Engineering and Operations confirmed these reports and determined that RadFxSat-2 is partially functioning, though signals are extremely weak. AMSAT thanks W5SAT for his report.

AMSAT also appreciate those who joined in determining whether they could detect their own or other signals in recent passes today.

At this time it is essential and we ask you: Please do not attempt to transmit through the transponder until further notice. This is very important to the next steps the team is taking now.

The next crucial step in evaluating the condition of RadFxSat-2 is to determine whether or not the 1200 bps BPSK telemetry beacon is operating and, if possible, copy telemetry from the beacon. AMSAT asks that everyone with 70cm receive capability listen to the beacon frequency of 435.750 MHz (+/-) Doppler, upper sideband (USB). Use FoxTelem with your receiver in order to tune and capture any telemetry you can. Also make sure FoxTelem is set to "Upload to server" so that AMSAT receives your telemetry data. If you capture a good IQ recording on SDR, please send a detailed description of your recording to foxtelem(a)amsat.us. The team may respond with a request for your recording and details on how to transfer it to the AMSAT Engineering team. Please understand that keeping the transponder clear is essential to putting all power and attention to the beacon telemetry.

Two-line elements (TLE's) are available in AMSAT's nasabare.txt distribution at https://www.amsat.org/tle/current/nasabare.txt. Available data suggests that RadFxSat-2 is OBJECT M from the Virgin Orbit LauncherOne launch, NORAD ID 47320, international designation 21-002M.

AMSAT thanks the Amateur satellite community for their perseverance and assistance while the AMSAT Engineering and Operations teams work to understand and resolve the situation with RadFxSat-2.

[ANS thanks the AMSAT Engineering and Operations teams for the above information]

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solar panels, propulsion, and attitude control. Come along for the
ride. The journey will be worth it!

https://tinyurl.com/ANS-GOLF

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NORAD ID 47320, international designation 21-002M. Therefore, The following satellite has been added to this week's AMSAT-NA TLE Distribution:

RadFxSat-2 - NORAD Cat ID 47320.
Thanks to Brad Schumacher, W5SAT for his report copying RadFxSat-2 and AMSAT Engineering Ops for the confirmation.

The following satellite has also been added to this week's AMSAT-NA TLE Distribution:

OBJECT N - NORAD Cat ID 47345.
This object was part of the Virgin Orbit LauncherOne Demo 2 launch of January 19, 2021. Object N was initially given the wrong launch date but that date was later corrected to 1-19-2021.

The current TLE's can always be downloaded at https://www.amsat.org/tle/current/nasabare.txt.

[ANS thanks Ray Hoad, WA5QGD, AMSAT Keplerian Elements Manager for the above information.]

QSO Today Virtual Ham Expo to Include Speaker Track on Amateur Radio Satellites

The QSO Today Virtual Ham Expo on March 13 – 14, 2021 will devote a speaker track to AMSAT and the world of Amateur Radio satellites.

The Expo is in “full planning mode” and promises “many exciting new things” for the upcoming event, which will include a world-class lineup of more than 60 speakers and workshops for beginners to experts. Presenters at nine AMSAT sessions will discuss the broad spectrum of ham radio satellites, including:

- Introduction to Amateur Radio Satellites (Douglas Quagliana, KA2UPW)

- Getting on the Air with Satellites (Clint Bradford, K6LCS)

- How to Enjoy Amateur Radio Contacts with the International Space Station (Frank Bauer, KA3HDO)

- Implementation of LDPC Encoder on FPGA (Anshul Makkar)

- Debris Mitigation in Earth’s Orbit (Anshul Makkar)

- Digital Multiplexing Transponder from the Open Research Institute (Michelle Thompson, W5NYV)

- Solving the ITAR and EAR Problem for the Amateur Radio Satellite Service (Michelle Thompson, W5NYV)

- Remote Labs for P4XT Engineering Development (Paul Williamson, KB5MU)

Thompson, an AMSAT Board Member, said working satellites is one of the most rewarding privileges of holding an Amateur Radio license.

“There has never been a better time to be involved in amateur radio satellites, since some long-standing regulatory burdens have been lifted and advanced technology has never been more affordable and accessible,” Thompson remarked. “We have opportunities now that were not available as of even a few years ago. AMSAT is fortunate to contribute to the Expo by showcasing the truly amazing work going on around the world in the amateur satellite scene. And the Expo is an ideal partner to show it off to the wider ham audience.”

AMSAT will have a booth at the Expo, where attendees can talk to experts, enthusiasts, operators, and technicians and obtain contact and membership information for the 30 AMSAT societies around the world.

Early Bird tickets are $10 (to help cover the cost of this event) and $12.50 “at the door.” That includes entry for the live, 2-day event as well as access during the 30-day on-demand period following the event. Register on the QSO Today Virtual Ham Expo website.

[ANS thanks the ARRL for the above information.]

Ham Radio's SuitSat Returns in Short Horror Film

SuitSat loses its innocence in a new video short sci-fi thriller Decommissioned. "Inspired by true events," the video short resurrects the 2006 spacesuit/satellite that transmitted messages on 2 meters as it circled Earth. The original SuitSat-1 project, conceived by an Amateur Radio on the International Space Station (ARISS) team, repurposed a decommissioned Russian Orlan spacesuit to function as a free-floating amateur radio transmit-only satellite.

"ARISS designed and built an antenna and radio gear that got approved for installation into the suit, and cosmonaut Valeri Tokarev and Commander Bill McArthur, KC5ACR, put SuitSat-1 into orbit at the start of a spacewalk," ARISS-US Delegate for ARRL Rosalie White, K1STO, recounted. SuitSat-1 transmitted a voice message, "This is SuitSat-1 RS0RS!" in several languages, plus telemetry and a slow-scan TV image on an 8-minute cycle as it orbited Earth.

In the 6-minute film, a SuitSat returns in the future to haunt International Space Station commander "Diaz," played by Joey Vieira. Diaz is seen taking photos from inside an observation dome on the ISS when he spies some distant space debris and radios Houston to express concern.

"If there was any cause for alarm, you know we'd see it too," Houston assures.

As the object closes in, an increasingly anxious Diaz recognizes the "debris" as SuitSat. "This is SuitSat," comes a voice on the ham radio.

"Houston, you're not gonna believe this. We're picking up transmissions on the ham radio that sound identical to the SuitSat experiment," he tells a skeptical mission control. "It's SuitSat! I'm seeing SuitSat!"

"SuitSat re-entered the atmosphere and burned up years ago," mission control responds. "It's impossible."

Decommissioned was produced by Perception Pictures and directed by Australian filmmaker Josh Tanner. He told Gizmodo that he produced the video "using the Unreal Engine technology that The Mandalorian used, albeit old-school rear projection, as opposed to the fancy LED wall tech they used."

SuitSat-1 — called Radioskaf or Radio Sputnik in Russian — was so successful that another unneeded Orlan spacesuit was subsequently refitted as SuitSat-2.

As an interesting sidebar with respect to the real SuitSat, White explained, "After the ARISS engineers calculated SuitSat-1's orbit and spin characteristics, they knew the legs and arms would have to be filled with something, so they asked the crew to stuff dirty laundry inside."

White said Decommissioned was a hit at a recent ARISS meeting. The original SuitSats were deorbited to burn up in Earth's atmosphere after their useful lives ended.

[ANS thanks the ARRL for the above information.]

Iodine Thruster Could Slow Space Junk Accumulation

For the first time ever, a telecommunications satellite has used an iodine propellant to change its orbit around Earth. The small but potentially disruptive innovation could help to clear the skies of space junk, by enabling tiny satellites to self-destruct cheaply and easily at the end of their missions, by steering themselves into the atmosphere where they would burn up. The technology could also be used to boost the mission lifetime of small CubeSats that monitor agricultural crops on Earth or entire mega-constellations of nanosats that provide global internet access, by raising their orbits

when they begin to drift towards the planet.

The technology was developed by ThrustMe, a spin-off company from the École Polytechnique and the French National Centre for Scientific Research (CNRS), and supported by ESA through its programme of Advanced Research in Telecommunications Systems (ARTES). It uses a novel propellant – iodine – in an electric thruster that controls the satellite's height above Earth. Iodine is less expensive and uses simpler technologies than traditional propellants. Unlike many traditional propellants, iodine is non-toxic and it is solid at room temperature and pressure. This makes it easier and cheaper to handle on Earth. When heated, it turns to gas without going through a liquid phase, which makes it ideal for a simple propulsion system. It is also denser than traditional propellants, so it occupies smaller volumes onboard the satellite.

ThrustMe launched its iodine thruster on a commercial research nanosat called SpaceTy Beihangkongshi-1 that went into space in November 2020. It was test fired earlier this month before being used to change the orbit of the satellite.

[ANS thanks ESA for the above information.]

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The downlink frequency was 145.800 MHz.
The astronaut was Sergey Kud-Sverchkov.
Contact was successful on Thursday, January 28, 2021 at 08:25 UTC.

The latest information on the operation mode can be found at
https://www.ariss.org/current-status-of-iss-stations.html.

[ANS thanks Charlie Sufana, AJ9N for the above information.]

Satellite Shorts from All Over

+ 35 Years Ago: Remembering Challenger and Her Crew

On Jan. 28, 1986, the astronauts once again boarded Challenger as managers had cleared the launch despite unexpectedly cold temperatures overnight at KSC. Managers considered significant ice covering parts of the launch tower as not enough of a concern to delay the launch. In behind-the-scenes discussions, concerns by engineers about the effects of the cold temperatures on the integrity of O-rings in SRB segment joints were overruled by managers who cleared Challenger to launch. Liftoff took place at 11:38 a.m. Eastern time.

As soon as Challenger cleared the launch tower, control of the vehicle shifted from KSC’s Launch Control Center to the Mission Control Center (MCC) at JSC, where ascent Flight Director Jay H. Greene and his team monitored the mission’s progress. For the first minute or so, the launch appeared to proceed normally, with the usual callouts between the crew and capsule communicator Richard O. Covey in MCC. At 73 seconds after liftoff, controllers lost all telemetry from Challenger and noticed a fireball on television screens. Stunned controllers slowly came to realize that the vehicle had suffered a major malfunction that the crew likely did not survive.

Read the entire article at
https://www.nasa.gov/feature/35-years-ago-remembering-challenger-and-her-crew.

[ANS thanks NASA for the above information.]

+ Build a Fully Automatic Amateur and APT Weather Satellite Ground Station

Over on GitHub stdevPavelmc has released his software called FAASGS (Fully Automatic Amateur Satellite Ground Station). FAASGS is an open source program that allows RTL-SDR users to set up a satellite ground station that tunes, record and generate images for NOAA APT weather satellites, as well as records FM amateur radio satellites. The software runs on a single board computer such as a Raspberry Pi.

Read the full article at https://www.rtl-sdr.com/.

[ANS thanks RTL-SDR.com for the above information.]

+ ‘Another One Leaves The Crust’ Launch Completed By Rocket Lab

Rocket Lab has successfully launched their 18th Electron mission, ‘Another One Leaves The Crust,’ on January 20, 2021. This is the first mission in a busy launch manifest for 2021, which includes multiple dedicated and rideshare small satellite missions for government and commercial customers. This year will also see Rocket Lab launch a Photon mission to the Moon in support of NASA’s CAPSTONE program.

For the complete story go to
https://news.satnews.com/2021/01/20/rocket-labs-first-launch-of-2021-for-mid-january-for-ohb-group/.

[ANS thanks SatNews.com for the above information.]

Not an AMSAT member? Join now at https://launch.amsat.org/

In addition to regular membership, AMSAT offers membership in the President's Club. Members of the President's Club, as sustaining donors to AMSAT Project Funds, will be eligible to receive additional benefits. President's Club donations may be made at https://tinyurl.com/ANS-PresClub.

Primary and secondary school students are eligible for membership at one-half the standard yearly rate. Post-secondary school students enrolled in at least half-time status shall be eligible for the student rate for a maximum of six post-secondary years in this status. Contact info at the amsat dot org for additional student membership information.

73,
This week's ANS Editor,
Frank Karnauskas, N1UW
n1uw at amsat dot org

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